

Instructional Materials Evaluation Criteria – Pre-Calculus

Title _____ **ISBN#** _____

Established Track Record? YES ☐ NO ☐

If yes, please list research source(s):

Meets National Mathematics Standards? YES ☐ NO ☐

Standard 1: Students will acquire number sense and perform fundamental operations with complex numbers.

Objectives	Indicators	Covered? Yes	Covered? No	Explanation of Coverage	Percentage of Coverage
Objective 1.1: Compute fluently with vectors and complex numbers.	a. Add, and subtract vectors using a variety of techniques.				
	b. Perform scalar multiplication on vectors using a variety of techniques.				
	c. Multiply complex numbers in polar form.				
	d. Write complex numbers in polar form and use DeMoivre's Theorem to find roots of complex numbers.				
Objective 1.2: Represent complex numbers and vectors in a variety of ways.	a. Represent vectors graphically and symbolically.				
	b. Represent complex numbers in rectangular and polar form and convert between rectangular and polar form.				

Standard 2: Students will use the language of algebra to analyze and represent relationships, including real-life relationships.

Objectives	Indicators	Covered? Yes	Covered? No	Explanation of Coverage	Percentage of
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					Coverage
Objective 2.1: Analyze exponential, polynomial, rational, logarithmic, piece-wise, and trigonometric functions Identify the domain, range, and other attributes of families of functions and their inverses.	a. Simplify expressions using a variety of approaches and techniques.				
	b. Identify vector-valued functions using a variety of approaches.				
	c. Raise a binomial to a power using the Binomial Theorem.				
	d. Relate the Binomial Theorem to combinations and Pascal's Triangle.				
Objective 2.2: Use functions to solve problems and describe mathematical relationships.	a. Solve equations and inequalities involving exponential, logarithmic, power, polynomial, rational, and trigonometric functions that reflect-real-world-situations.				
	b. Relate logarithmic and exponential functions.				
	c. Combine and compose functions using algebraic methods or by using technology when appropriate.				
	d. Identify the domain and range of a function resulting from the combination or composition of functions.				
	e. Given a real-world relationship, Identify a family or families of functions that model that relationship.				
Objective 2.3: Analyze the behavior of functions.	a. Approximate instantaneous rates of change and find average rates of change using graphical and numerical data.				
	b. Determine intervals over				

	which a function is increasing or decreasing.				
	c. Identify and analyze graphical features of functions such as x- and y- intercepts, zeros (roots), asymptotes, holes, local, global, and end behavior.				
	d. Relate the graphical representation of discontinuities and end-behavior to the concept of limit.				
	e. Identify the effects of changing the parameters in transformations of functions.				
Objective 2.4: Analyze the behavior of sequences and series.	a. Identify a sequence as an infinite string of numbers.				
	b. Understand that a sequence can be defined as a function with the domain of natural numbers.				
	c. Understand the various notations of sequences and series.				
	d. Identify and accurately express arithmetic and geometric sequences.				
	e. Identify a geometric series as convergent or divergent.				
	f. Identify a geometric series as convergent or divergent.				

Standard III: Students will solve problems using spatial and logical reasoning, applications of geometric principles, and modeling.					
Objectives	Indicators	Covered? Yes	Covered ? No	Explanation of Coverage	Percentage of Coverage
Objective 3.1: Analyze characteristics and properties	a. Determine and analyze the equations and characteristics of				

of two- and three-dimensional shapes and develop mathematical arguments about geometric relationships.	conic sections using their geometric definitions.				
	b. Solve problems using the geometric properties of vectors.				
Objective 3.2: Solve problems using trigonometry.	a. Define the six trigonometric functions using the unit circle.				
	b. Develop trigonometric identities using definitions, the Pythagorean Theorem or other relationships.				
	c. Simplify trigonometric expressions and solve trigonometric equations using identities.				
	d. Use the Law of Sines and the Law of Cosines to solve problems.				

Standard 4: Students will select and utilize measurement tools and techniques needed to apply mathematical formulas for addressing real-life problems.					
Objectives	Indicators	Covered? Yes	Covered ? No	Explanation of Coverage	Percentage of Coverage
Objective 4.1: Understand measurable attributes of objects and the units, systems, and processes of measurement.	a. Compare and contrast linear and exponential scales.				

Standard 5: Students will draw reasonable conclusions using concepts, relationships, and algorithms of probability.					
Objectives	Indicators	Covered? Yes	Covered ? No	Explanation of Coverage	Percentage of Coverage

			No		Coverage
Objective 5.1: Apply basic concepts of probability.	a. Relate the Binomial Theorem to combinations and Pascal's Triangle.				
	b. Differentiate between, and calculate probabilities of, independent and dependent events.				
	c. Calculate probabilities of compound events.				
	d. Calculate and interpret the expected value mean of simple discrete random variables.				

Curriculum Coverage	3	2	1	0	N/A
Meets Core Standards and Objectives	80% of the state core objectives are covered. Objectives in instructional materials are clearly stated with measurable outcomes.	70% of the state core objectives are covered. Objectives in instructional materials are clearly stated with measurable outcomes.	50% of the state core objectives are covered.	Less than half of the state core objectives are covered.	
Content	Accurate information reflecting current mathematical knowledge. No content bias.	Some inaccuracies found, however information reflects current mathematical knowledge. No content bias.	Many inaccuracies were found on major mathematical concepts or content bias created problems with mathematical concepts.	Major inaccuracies found in mathematical content or concepts.	
Covers Process Skills	Materials support and encourage students to use mathematical process skills (i.e., problem solving, communication, reasoning and proof, connections, representation).	Materials provide a range of activities with set outcomes. Process skills are mentioned but not incorporated into instructional process.	Materials provide a set of explicit step-by-step instructions. Limited amount of process skills mentioned.	No hands-on activities. No process skills mentioned.	
Age Appropriate	A wide range of activities to accommodate various developmental levels at a reasonable pace and depth of coverage. Includes age appropriate cross-curricular references (e.g., literature, software, etc.) Content organized so prerequisite skills and knowledge are developed before more complex skills.	Some activities are adaptable to the appropriate age level. Some cross-curricular activities are given. Some attention given to prerequisite skills and knowledge.	Limited developmentally appropriate activities. Prerequisite skills and prior knowledge are not sufficiently developed before more complex concepts are introduced.	Age appropriate issues are not addressed. Several activities are not based on appropriate levels.	
Pedagogically Sound	Facilitates a wide range of teacher and student activities that reflect various learning styles and individual needs of students. Includes a wide variety of pedagogical strategies for flexible grouping and instruction.	Encourages and assists teachers in addressing learning styles and individual needs of students. Includes various pedagogical strategies for flexible grouping and instruction.	Addresses differences in learning and teaching to a limited degree. Includes some pedagogical strategies for flexible grouping and instruction.	Hinders effective pedagogy.	

Physical Qualities	3	2	1	0	N/A
Durability	Materials are securely bound and reinforced.	Materials are hardbound adequately.	Materials have secure binding.	Materials have inferior binding.	
Print Size and legibility for intended grade level	Appropriate use of font size and format for intended grade level.	Font size adequate for intended grade level.	Font size and format too small or too large for age group.	Font size inconsistent.	
	Key words or phrases bold faced and/or italicized.	Some key words or phrases boldfaced and/or italicized.	Highlighting was used too much, emphasized too much information.	No key words or phrases boldfaced or italicized.	
Pictures, tables, and graphics	Appropriate and varied pictures, tables, and graphs. Graphs and tables are correctly labeled (e.g., titles, keys, labels).	Limited pictures, tables, and graphs. Some tables and graphs are not labeled correctly.	Very limited pictures, tables, and graphs.	Inappropriate pictures, tables, and graphs.	
Includes table of content, glossaries, and index	Tables of contents, indices, glossaries, content summaries, and assessment guides are designed to help teachers, parents/guardians, and students. Clearly represents concepts within the text.	Tables of contents, indices, glossaries, content summaries, and assessment guides are designed to help teachers, parents/guardians, and students, are adequate but not clearly defined concepts within the text.	Simple tables of contents, indices, glossaries, content summaries, and assessment guides are included.	Is missing one or more of the following: simple table of contents, glossaries, content summaries, assessment guides, or indices.	
Ancillary Materials	3	2	1	0	N/A
Teacher Materials	Lesson plans are easy to understand and implement. Are clearly written and presented with accurate concepts.	Most lesson plans are easy to understand and implement. Are clearly written and presented with accurate concepts.	Lesson plans are difficult to understand.	No lesson plans.	
	Mathematical terms and academic vocabulary are appropriately used.	Generally mathematical terms and academic vocabulary are appropriately used.	Some mathematical terms and academic vocabulary are appropriately used.	There is a lack of mathematical terms and academic vocabulary.	
	Incorporates integration suggestions to other curriculum areas.	Most integration supports other curricular areas.	Some integration support for other curricular areas.	No integration support available.	
	Investigations and problem solving activities focus on demonstrating mathematical principles in the content area.	Most investigations and problem solving activities focus on demonstrating mathematical principles in the content area.	Limited investigations and problem solving activities focus on demonstrating mathematical principles in the content area.	Investigations and problem solving activities are not related to content area or no investigation activities.	

Ancillary Materials cont.	3	2	1	0	N/A
Student Materials	Activities engage students in purposeful mathematics.	Most activities engage students in purposeful mathematics.	Some activities engage students in purposeful mathematics.	Activities do not develop the concept studied.	
	Activities incorporate use of process skills (i.e., problem solving, communication, reasoning and proof, connections, representation) for deep understanding of mathematical principles.	Activities encourage the use of process skills for deep understanding of mathematical principles.	Activities mention the use of process skills for deep understanding of mathematical principals.	Activities do not encourage process skills for deep understanding of mathematics.	
	Includes ideas to extend concepts in real world applications.	Some ideas are included to extend concepts in real world applications.	Limited real world applications.	No real world applications suggested.	
Parent Materials	Homework assignments and activities support classroom learning and are written so that parents/guardians can help their children.	Suggested strategies and activities to assist parents/guardians.	Limited activities available for parent/guardian use.	No parent/guardians activities included.	
	ESL strategies and activities that support classroom learning are provided in materials sent home to parents.	Some ESL strategies and activities are provided in materials sent home to parents.	A few ESL strategies and activities that may be sent home to parents are provided.	No ESL strategies and activities are provided.	
Manipulatives	Manipulatives are provided and are appropriate.	Manipulatives are provided.	Manipulatives are not provided.	Manipulatives are not part of the program.	
	Manipulatives can be replaced economically and locally.	Manipulatives can be replaced locally or by mail order.	Needed manipulatives can be obtained locally or special ordered.		
Technology (teachers)	3	2	1	0	N/A
Ease of Use	Menus are easy to read and follow.	Menus are generally easy to read and follow.	Menus are easy to read. Might have to read manual to understand operation of technology. (e.g., laser remote, software.)	Menus are not very descriptive. Hard to follow.	
	User-friendly installation requires a minimal level of computer expertise.	Installation requires little computer expertise.	Installation requires some knowledge or expertise.	Installation requires expertise.	
	Manual and directions are understandable.	Manuals and directions are simple.	Manuals are included.	No manuals or written instructional materials are provided.	

Technology (teachers) cont.	3	2	1	0	N/A
Audio/Visual attributes	High quality audio and visuals are correct and contribute to overall effectiveness of program.	Audio and visuals are of good quality. Complements program effectiveness.	Audio and visuals are acceptable. Aligned with program content.	Audio and visual defects are apparent. Distracts from program content.	
	Information is current and up-to-date.	Information is current.	Information is mostly current.	Information is out-of-date.	
Enhances learning experience	Enhances learning experience. Adds depth and diversity.	Offers some additional depth and diversity to learning experience.	Mild impact to overall learning experience.	Does not impact learning experience.	
Technology (students)	3	2	1	0	N/A
Calculator	Appropriate activities and materials are provided to explore and prove conjectures.	Activities help students learn use to use calculator to explore concepts	Activities to learn to use calculators	No use of calculators or calculators used to check work only.	
Computer	Software allows students to explore and prove mathematical conjectures	Software allows students to explore math conjectures	Software demonstrates processes for mathematical applications	Drill and practice only	
Universal Access	3	2	1	0	N/A
Content accurately reflects diverse population	Provides ways to adapt curriculum for all students (e.g., special needs, learning difficulties, English language learners, advanced learners.)	Provides some ways to adapt curriculum to meet assessed special needs.	Provides limited strategies to assist special needs students.	Inappropriate strategies to assist special needs students.	
	Accurate portrayal of cultural, racial, and religious diversity in society.	Mostly accurate portrayal of cultural, racial, and religious diversity in society.	Does not address diversity in society.	Inaccurate portrayal of diverse populations and society.	
Assessment	3	2	1	0	N/A
Provides a variety of assessment options	Multiple measurements of individual student progress at regular intervals ensuring success of all students.	Assessment requires students to apply some concepts.	Assessment requires students to apply few concepts.	Provides only paper and pencil assessment.	

Assessment cont.	3	2	1	0	N/A
Assessment tools	Scoring tools and rubrics in assessment package.	Some scoring tools and rubrics provided.	Very few assessment tools are provided.	Answer keys to paper and pencil assessments.	
Assessment alignment to objectives	Assessment is provided to assess 80% of stated objectives with a variety of assessment strategies and items.	Assessment is provided to assess 70% of stated objectives.	Assessment is provided to assess 50% of stated objectives.	Assessment is provided to assess less than 50% of stated objectives.	
Assessment for understanding	Assessment requires the application of ideas and concepts.	Assessment requires the application of some ideas and concepts.	Assessment requires the application of few ideas and concepts.	No application of ideas and concepts.	